CLAIMS

I CLAIM:

1. An apparatus for detecting objects on an airport runway comprising:

an optical system;

an object location processor operably linked to said optical system;

an object characterizer operably linked to said object location processor;

an alarm activation processor operably linked to said object characterizer;

an alarm generator operably linked to said alarm activation processor; and

a user interface operably linked to said alarm generator.

2. The apparatus according to Claim 1, wherein said optical system further comprises one or more optical transmitters and one or more optical receivers.

3. The apparatus according to Claim 1, wherein said optical system further comprises one or more optical transceivers and one or more optical reflectors.

4. The apparatus according to Claim 2, further comprising one or more optical reflectors.

5. The apparatus according to Claim 2, further comprising one or more optical transceivers.

6. The apparatus according to Claim 1, wherein said object location processor further comprises an intrusion sensor detection system.

7. The apparatus according to Claim 1, wherein said object location processor further comprises an operation sensor detection system.

8. The apparatus according to Claim 1, wherein said object location processor further comprises an output inspector diagnostic system.

9. The apparatus according to Claim 1, wherein said object characterizer further comprises a motion detection processor.

10. The apparatus according to Claim 1 wherein said object characterizer processes the proximity of the object relative to the location of an aircraft.

11. The apparatus according to Claim 1, wherein said user interface further comprises a graphical interface.

12. The apparatus according to Claim 1, wherein said user interface further comprises a no alarm indicator.

13. The apparatus according to Claim 1, wherein said user interface further comprises a future risk indicator.

14. The apparatus according to Claim 1, wherein said user interface further comprises an imminent danger indicator.

15. The apparatus according to Claim 1, further comprising a support mechanism for the optical system.

16. The apparatus according to Claim 15 wherein said support mechanism further comprises means for adjusting the height of the support mechanism.

17. The apparatus according to Claim 15 wherein said support mechanism further comprises means for adjusting the height of the optical system.

18. The apparatus according to Claim 15 wherein said support mechanism further comprises means for heating the support mechanism and the optical system.

19. The apparatus according to Claim 1 wherein said optical system further comprises a protective cover.

20. An apparatus for detecting objects on an airport runway comprising:

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an optical system;

wherein said optical system further comprises one or more optical transmitters and one ore more optical receivers; one or more optical transceivers and one or more optical reflectors; or a combination of optical transmitters/optical receivers and optical transceivers/optical reflectors;

an object location processor operably linked to said optical system;

an object characterizer operably linked to said object location processor;

an alarm activation processor operably linked to said object characterizer;

an alarm generator operably linked to said alarm activation processor; and

a user interface operably linked to said alarm generator.

21. The apparatus according to Claim 20, wherein said object location processor further comprises one or more selected from the group consisting of an intrusion sensor detection system, an operation sensor detection system, and an output inspector diagnostic system.

22. The apparatus according to Claim 20, wherein said object characterizer further comprises a motion detection processor.

23. The apparatus according to Claim 20, wherein said user interface further comprises one or more selected from the group consisting of a graphical interface, a no alarm indicator, a future risk indicator, and an imminent danger indicator.

24. The apparatus according to Claim 20, further comprising a support mechanism for said optical system.

25. The apparatus according to Claim 24 wherein said support mechanism further comprises means for adjusting the height of one or more selected from the group consisting of said support mechanism and said optical system.

26. The apparatus according to Claim 24 wherein said support mechanism further comprises means for heating the support mechanism and the optical system.

27. The apparatus according to Claim 24 wherein said optical system further comprises a protective cover.

28. An apparatus for detecting objects on an airport runway comprising:

an optical system;

wherein said optical system further comprises

one or more optical transmitters and one ore more optical receivers; or

one or more optical transceivers and one or more optical reflectors;

or a combination of optical transmitters/optical receivers and optical transceivers/optical reflectors;

an object location processor operably linked to said optical system;

wherein said object location processor further comprises one or more selected from the group consisting of an intrusion sensor detection system, an operation sensor detection system, and an output inspector diagnostic system;

an object characterizer operably linked to said object location processor;

wherein said object characterizer further comprises a motion detection processor;

an alarm activation processor operably linked to said object characterizer;

an alarm generator operably linked to said alarm activation processor; and

a user interface operably linked to said alarm generator.

29. The apparatus according to Claim 28, wherein said user interface further comprises one or more selected from the group consisting of a graphical interface, a no alarm indicator, a future risk indicator, and an imminent danger indicator.

30. The apparatus according to Claim 28, further comprising a support mechanism for said optical system.

31. The apparatus according to Claim 28 wherein said support mechanism further comprises means for adjusting the height of one or more selected from the group consisting of said support mechanism and said optical system.

32. The apparatus according to Claim 31 wherein said support mechanism further comprises means for heating the support mechanism and the optical system.

33. The apparatus according to Claim 31 wherein said optical system further comprises a protective cover.

34. An apparatus for detecting objects located on an airport runway surface comprising:

a) one or more optical laser transmitters and one or more optical laser receivers;

b) one or more optical laser transceivers and one or more optical laser reflectors; or

c) any combination of a) and b);

for sensing the presence of objects on an airport runway surface.

35. An apparatus for detecting objects or other debris on an airport runway surface comprising one or more optical laser transmitters arranged to transmit optical laser beams across portions of a runway surface; one or more of optical laser receivers arranged to receive said optical lasers, and an object location processor to process signals from said one or more of optical laser receivers to determine the presence of an object on the runway surface.

36. The apparatus of claim 35, further comprising reflectors arranged to reflect said optical lasers to optical laser transceivers or receivers.

37. The apparatus according to claim 35 further comprising one or more optical laser transceivers and one or more optical laser reflectors for sensing the presence of objects on an airport runway surface.

38. A method for detecting objects on an airport runway comprising:

a) detecting the presence of an object on an airport runway by the object's interruption of one or more optical laser beams generated by an optical system;

b) processing the output from the optical system to determine the location of the object on the runway;

c) transmitting the information regarding the object to appropriate personnel.

39. The method according to Claim 38 further comprising the step of processing the output from the optical system to determine the type of object on the runway.

40. The method according to Claim 38 wherein said step of transmitting the information regarding the object to appropriate personnel further comprises transmitting the information to a user interface to alert appropriate personnel.

41. A method for detecting objects on an airport runway comprising:

a) detecting the presence of an object on an airport runway by the object's interruption of one or more optical laser beams generated by an optical system;

b) processing the output from the optical system to determine the location of the object on the runway;

c) processing the output from the optical system to determine the type of object on the runway;

d) processing the output from the optical system to determine the appropriate degree of danger posed by the presence of the object on the runway;

e) transmitting the information regarding the object to a user interface.

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